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BuildingName
The Description of the Project
P00000000 0000

SPECIFICATION DIVISION 23

NUMBER SECTION DESCRIPTION

230930
SECTION 230930 – REFRIGERANT DETECTION AND ALARM

END OF CONTENTS TABLE

DIVISION 23
SECTION 230930 – REFRIGERANT DETECTION AND ALARM

REMOVED THE STATEMENT THAT U-M PROVIDES THE REFRIGERANT MONITOR AND CALIBRATES IT. PART 1 UPDATED TO THE CURRENT U-M MASTER SPEC FORMATTING TEMPLATE. PART 2 UPDATED TO PROVIDE TECHNICAL DETAIL ON REFRIGERANT MONITORS. PART 3 UPDATED TO REQUIRE FINAL SETUP AND CALIBRATION OF MONITOR BY A FACTORY SERVICE REP. D. KARLE FOR HVAC MTT OCT. 2014

AUGUST 2015: REVISED TO DELETE HORNS, LIGHTS, TUBING, WHICH WILL NOW BE PROVIDED BY THE MECHANICAL SYSTEMS CONTROLS CONTRACTOR (MSCC). REVISED TO DELETE CHILLGARD MODEL LE BECAUSE OR ONGOING RELIABILITY ISSUES REPORTED BY PLANT. D.KARLE FOR STEAM/HYDRONICS MTT.

NOV. 2018 REVISED TO ADD BACHARACH AS APPROVED, REVISE MSA MODEL NUMBER, REDUCE ACCURACY REQUIREMENTS, AND OTHER MINOR CHANGES. D. KARLE PER HYDRONICS MTT WITH INPUT FROM C. BUTCHER.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Standard General Conditions, Supplemental General Conditions, Division 01 Specification Sections, and other applicable Specification Sections, apply to this Section.

B. Related Sections:

1. Section 019110/019100 - Commissioning
2. Section 221113 - Piping Materials and Methods
3. Section 220500 – Common Work Results for Mechanical
4. Section 230900 – Mechanical Systems Controls
5. Division 26: - Electrical.

1.2 SUMMARY

A. Refrigerant monitor/controller and accessories for detecting refrigerant leaks, controlling equipment, and providing local and remote alarms.

1.3 SUBMITTALS

A. Product Data: Include manufacturer, catalog illustrations, model, rated capacities, performance, dimensions, component sizes, rough-in requirements, materials of construction, and operating and maintenance clearance requirements. Additionally include::

1. Project specific wiring diagram indicating inputs and outputs to the refrigerant monitor/controller.
2. Installation, operation, and maintenance instructions for all devices.

1.4 QUALITY ASSURANCE

A. Manufacturers and Products: The products and manufacturers specified in this Section establish the standard of quality for the Work. Subject to compliance with all requirements, provide specified products from the manufacturers named in Part 2.

B. Reference Standards: Products in this section shall be built, tested, and installed in compliance with the specified quality assurance standards; latest editions, unless noted otherwise.

1. Michigan Mechanical Code.
2. ASHRAE Standard 15: Safety Standard for Refrigeration Systems (ANSI Approved).
3. ASHRAE Standard 34: Designation and Classification of Refrigerants.
4. UL 2075: UL Standard for Safety Gas and Vapor Detectors and sensors.
5. UL 61010-1: Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials and accessories raised off the floor or ground on pallets and protected with coverings to prevent damage or contamination due to weather and construction activities. Provide temporary protective caps on pipe or tubing ends. Store in areas that prevent damage due to freezing and extreme temperatures or sunlight. Protect from damage, dirt and debris at all times.

1.6 WARRANTY

A. Provide a complete parts and labor warranty for a minimum of one year from the date of Substantial Completion.

PART 2 - PRODUCTS

DESIGNER TO PROVIDE REFRIGERANT DETECTION, ALARM, AND VENTILATION SYSTEM THAT COMPLIES WITH ASHRAE STANDARD 15 AND THE BUILDING CODE.

INDICATE ON THE DESIGN DRAWINGS THE NUMBER AND LOCATION OF WARNING HORNS AND LIGHTS THAT ARE ACTIVATED WHEN A REFRIGERANT LEAK IS DETECTED, AND THE NUMBER AND LOCATION OF SAMPLE POINTS.

PROVIDE A CONTROL DRAWING INDICATING THAT THE REFRIGERANT MONITOR PLACES THE MACHINERY ROOM INTO THE CODE REQUIRED VENTILATION MODE UPON DETECTION OF A REFRIGERANT LEAK. USE U-M STANDARD DETAIL MD 230930 001 "REFRIGERANT MONITOR CONTROL" FOR THIS PURPOSE, REVISED TO BE PROJECT SPECIFIC AND TO INDICATE THE REFRIGERANT TYPE(S) TO BE MONITORED ALONG WITH THE CORRESPONDING ALARM SET POINTS. THE LOW ALARM SET POINT SHALL BE 1/10 THE OEL, THE HIGH ALARM SET POINT SHALL BE 1/2 THE OEL, WHICH ARE LISTED IN CHAPTER 11 OF THE MICHIGAN MECHANICAL CODE, EXCEPT R123 SHALL BE SET FOR ≥ 30 PPM (LOW) AND ≥ 50 PPM (HIGH).

2.1 REFRIGERANT MONITOR

A. Approved Manufacturers: Bacharach HGM-MZ, MSA Chillgard 5000

B. Provide infrared technology refrigerant monitor and controller, capable of detecting the refrigerant types in the machinery room.

1. Measurement range: 0-1000 ppm
2. Minimum detection limit: +/- 1 ppm
3. Accuracy: ±10% of reading
4. Display resolution: 1 ppm
5. 4-20mA isolated output indicating refrigerant concentration
6. Manual alarm reset
7. Capable of sensing the number of locations indicated on the design documents.
8. With alarm beacon and horn mounted on the monitor cabinet.
9. Capable of sampling up to 400 feet with 1/4" I.D. copper tube.
10. Provide end of line sample tube filters, quantity to match the number of sensing locations indicated.
11. 120 VAC power supply

C. Provide remote relay modules and a multipoint sequencer, as required to accomplish the design intent expressed in the contract documents. At minimum provide outputs to provide the following functionality:

1. A low alarm which activates by latching a normally open Form C (SPDT) contact.
2. A high alarm which activates by latching a normally open Form C (SPDT) contact.
3. A refrigerant monitor fault alarm, which de-energizes a normally closed contact to indicate there is problem with the refrigerant monitor system. The same contact shall de-energize upon a loss of power to the monitor.
4. A reset switch that resets the high and low alarm states if the condition that caused the alarm has abated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall comply with the refrigerant monitor manufacturer's recommendations and the contract documents.

3.2 FIELD QUALITY CONTROL

A. Provide a manufacturer trained service technician to perform start-up services. The service technician shall perform the following:

1. Verify correct installation of the monitor.
2. Perform set-up and calibration of the monitor using a NIST traceable test mixture. Attach a calibration sticker on the monitor listing date of calibration and calibration details.
3. Participate in the commissioning of the refrigerant monitor system.
4. Provide all the monitor passwords to the Owner.

5. Fill out and submit the UM standard calibration and testing report form provided by UM. Provide a written service report prepared on site and submit both at the time of the service visit (with copies immediately provided to the Owner and Commissioner). Service report shall indicate services provided and list all controller settings and alarm setpoints.

3.3 COMMISSIONING

A. Perform the commissioning activities as outlined in the Division 1 Section titled Commissioning and other requirements of the Contract Documents.

END OF SECTION 230930